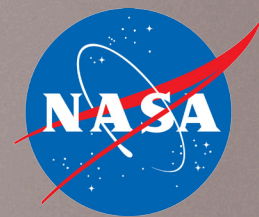


National Aeronautics and Space Administration



goddardview

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Letter from the Editor

Goddard View Reader:

Goddard View is changing to become as dynamic as Goddard itself.

Beginning in March, *Goddard View* will be a weekly publication. The *View* will continue to contain stories about Goddard missions and achievements combined with features on the people behind Goddard's innovations and exploration. The new *View* will also include elements highlighting the most recent news and snapshots from the previous week.

The refreshed *Goddard View* will also be more interactive. For example, images in the *View* will be linked to Goddard's Flickr® galleries and articles will contain hyperlinks to access additional information. Through these enhancements, readers will get more out of their reading experience. The editors will work closely with Goddard contributors to maximize these new features of *Goddard View*.

Thank you for your continued support and contributions to *Goddard View*. Watch Dateline in the coming weeks for the first issue of the new *Goddard View*.

Sincerely,
John M. Putman
Editor, *Goddard View*



GoddardView

Volume 8 Issue 1

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On the cover: NASA Administrator Charles Bolden makes a
joke while talking about the Fiscal Year 2013 NASA Budget.
Photo credit: NASA/Goddard/Bill Hrybyk

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Deadlines: News items for publication in the Goddard View must be received by noon of the 1st and 3rd Thursday of the month. You may submit contributions to the editor via e-mail at john.m.putman@nasa.gov. Ideas for new stories are welcome but will be published as space allows. All submissions are subject to editing.

NASA Administrator Talks Budget

By John M. Putman

NASA Administrator Charles Bolden visited Goddard February 14 to discuss the Fiscal Year 2013 NASA budget. Bolden and Goddard Center Director Rob Strain also took questions from employees.

After an introduction by Strain, Bolden gave a presentation that shed light on the 2013 Budget. His presentation began with a collage of images of NASA employees in their work environments. Bolden paused on this slide and said, "This is what NASA is, people. We don't get anything done without the people."



Caption: NASA Administrator Charles Bolden discusses the Fiscal Year 2013 NASA Budget.

Bolden stated during his presentation that NASA is functioning in a "very constrained fiscal environment." He also mentioned that NASA is doing better relative to the rest of Government. "Other agencies are taking big hits," Bolden said.

Strain returned to the podium after Bolden's presentation to speak specifically about Goddard's budget. He echoed Bolden's comments about the constrained fiscal environment. He pointed out, however, that Goddard's budget does fully fund all of the Center's major missions.

After his remarks, Strain showed a short video that highlighted some of Goddard's recent and developing missions.



Caption: NASA Administrator Charles Bolden and Center Director Rob Strain take questions from Goddard employees.

In a bittersweet moment, Strain took the opportunity to talk about his imminent departure from Goddard. Strain said, "I remain one of Goddard's biggest cheerleaders. I couldn't be more please to be a small part of the Goddard family."

In saying goodbye to Strain, Bolden said, "Goddard is the most diverse, most challenging center in the universe. Rob gets my heartfelt thanks and congratulations for all he has accomplished here."

After the question and answer session following the event, Administrator Bolden visited Building 29 and talked to took questions from the media. He then met with Bill Ochs, James Webb Space Telescope (JWST) Project Manager, and Amber Straughn, Deputy Project Scientist for Education and Public Outreach. While there, Bolden saw some of the spacecraft's hardware and JWST being assembled in the high bay clean room. ■



Caption: NASA Administrator Charles Bolden (center) listens to Amber Straughn (far left), Deputy Project Scientist for Education and Public Outreach.

NASA Scientist and Education Award Winner Leads Student Phytoplankton Study

By Rob Gutro

Dr. Tiffany Moisan is a NASA scientist who thrives on studying the ocean and has a passion for educating and inspiring students in ocean sciences. Last year, Moisan received an award that enabled her to work with the education community and bring students into the field for a hands-on learning experience.

Moisan, together with other scientists and educators, has created a curriculum that will enable other schools to do the same thing. It is called Rising Tides and is available in book form on the Internet. It was distributed to Virginia schools and describes coastal oceanography.

Dr. Moisan works in the Ocean Sciences Branch of the Hydrospheric and Biospheric Sciences Laboratory at Wallops Flight Facility, Wallops Island, Va. The laboratory is located on Virginia's Eastern Shore.

In 2011, she was awarded an Education Internal Research and Development (IRAD) award. She developed a curriculum for middle school to undergraduate students that utilized an ocean optics radiometer to measure reflectance and solar stimulated fluorescence. She led a collaboration with John Hopkins Talented Youth Program in Baltimore, Md. and Ocean Optics Company in Dunedin, Fla. that distributed the instrument and accompanying curriculum. The curriculum's goal was to create a hands-on project to inspire and teach students in biology, optics, physics, and oceanography, and to explain climate change processes within the carbon cycle.

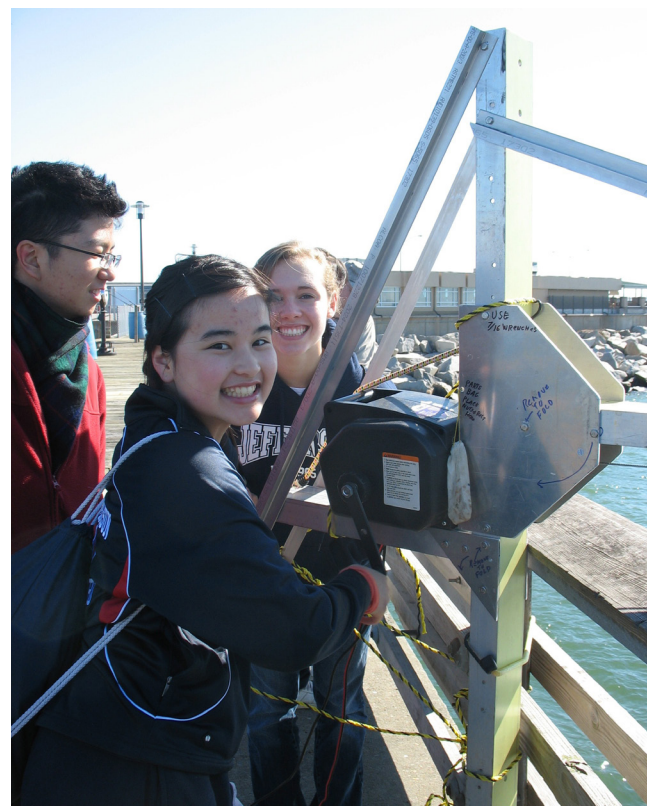
In November 2011, Dr. Moisan and students from the Thomas Jefferson High School for Science and Technology (TJHSST) in Alexandria, Va., worked together in the field to conduct physiology experiments to understand how phytoplankton respond to diurnal changes in light, temperature, and tides to understand how coastal productivity changes over the day.



Caption: Dr. Wu, Dr. Tiffany Moisan, and students from Thomas Jefferson High School for Science and Technology spend a day working on the dock on the Bay, exploring the waters beneath the fishing pier near the Chesapeake Bay Tunnel.

Moisan said, "Students got hands-on experience by using mini spectrometers to understand the physics of color and the biology on phytoplankton, the base of the food chain. I believe a wider distribution or library of these spectrometers can be created for many schools to use at an affordable cost. We watched with pleasure as students were able to connect microscopy samples with in situ instrumentation to ocean color satellites."

The students joined Dr. Moisan at the Chesapeake Bay Tunnel pier, located on the Delmarva Peninsula. The Delmarva Peninsula is a large peninsula on the East Coast of the United States, occupied by most of Delaware and portions of Maryland and Virginia. Students experienced how scientists sample the ocean. Samuel Thompson, a student in the Undergraduate Student Research Program joined Rachel Steinhardt of Sigma Space Corporation, Lanham, Md., to collect water. The samples were analyzed quickly in a garage, set up like a laboratory, where filtration and physiological measurements were conducted.



Caption: Students work the winch built by NASA oceanographers to collect water samples on the Chesapeake Bay fishing pier near Norfolk, Va.

The students worked as research scientists in the field and applied concepts of oceanography that they had been reading about in class. They were amazed to see a combination of high-tech instruments like the spectrophotometer being used alongside simple devices such as a winch on the pier. The scientists were doing what is necessary to collect data and making adjustments as they were working in the field.

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NASA Scientist and Education Award Winner Leads Student Phytoplankton Study

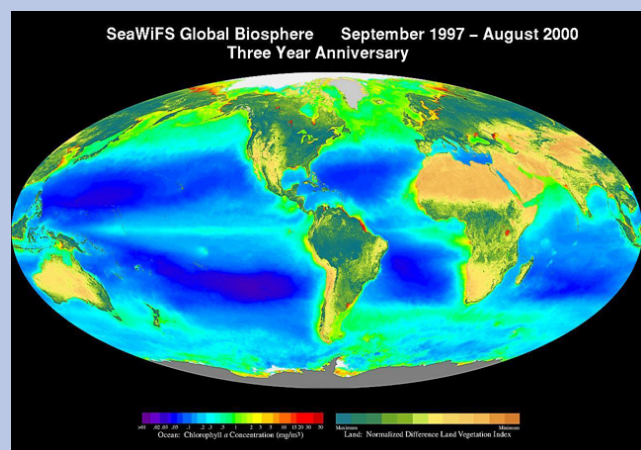
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"Working alongside the scientists emphasized that engineering skills and creativity are as important in research as core knowledge in math and science," said Lisa Wu, Director of the Oceanography and Geophysical Systems Laboratory, at TJHSST. "For some students, knowing that NASA works in Earth's inner space as well as outer space was an eye opener. The fall algal bloom was a bonus."

Later, students returned to their high school laboratories to witness a dinoflagellate bloom under a microscope. The students also compared the water quality analysis to NASA satellite imagery.

Several of the students are following up with applications for summer internships that would expand on this work with her during the summer.

NASA contributes a tremendous data set—called "ocean color"—to the oceanographic community. Ocean color is the characteristic hue of the ocean according to the presence and concentration of specific minerals or substances, such as chlorophyll. Together with global or regional maps of pigment distribution of phytoplankton all over the world and other products, NASA gives global coverage of phytoplankton information to scientists and the public. NASA scientists study the ocean using satellites and colored dissolved organic matter, ocean biology, calibration of the satellite, modeling of the physics of the ocean, etc.



Caption: This SeaWiFS image of our world depicts the Global Biosphere—the ocean's long-term average phytoplankton chlorophyll concentration acquired between September 1997 and August 2000 combined with the SeaWiFS-derived Normalized Difference Vegetation Index over land. This image shows where there is more or less plant life on our planet. On land, the dark greens show where there is abundant vegetation and tans show relatively sparse plant cover. In the oceans, red, yellow, and green pixels show dense phytoplankton blooms, those regions of the ocean that are the most productive over time, while blues and purples show where there is very little of the microscopic marine plants called phytoplankton.

Thomas Jefferson High School for Science and Technology is a unique Fairfax County public school offering a comprehensive program that focuses on scientific, mathematical, and technological fields. The TJHSST students that accompanied Moisan attended the Oceanography/Geophysical Systems Lab at the school. The lab explores the biology, chemistry, geology, and physics of the Earth's last frontier.

As a Governor's school, TJHSST serves as a resource for other elementary, middle, and high schools from the five nearby Virginia counties, as well as around the Nation and for the international community. Its goal is to connect educators, scientists, and students in real-world scientific inquiry. This is done through video conferencing as well as face to face during professional conferences or field trips.

Moisan said, "NASA's relatively modest investment in this activity has produced profound results. It's a great way to interest students in STEM studies, and I hope we will be able to continue to do so in the future. Hands-on activities such as these are needed in STEM." Moisan said she wanted to be a scientist ever since she was young. At Texas A&M University, where she worked in an oceanographic laboratory as undergraduate, she decided to become a phytoplankton ecologist and pursue higher degrees. She's traveled to exotic places such as the Antarctic to study phytoplankton, something that she hopes all students will be inspired to do.

Students can gain the fascination about science at an early age, which will help motivate them to pursue jobs in the science and engineering field. "There is no greater feeling than discovering something on your own," she said.

For more information about NASA's phytoplankton research, visit: <http://phytoplankton.gsfc.nasa.gov>.

For more information about the Thomas Jefferson High School for Science and Technology, visit: <http://www.tjhsst.edu>. ■

Goddard Team Builds State-of-the-Art Facility for New Sun-Earth Mission

By Lori Keesey

When it launches in 2014, NASA's new *Magnetospheric Multiscale* (MMS) mission will give scientists unprecedented insights into a little-understood physical process at the heart of all space weather. This process, known as magnetic reconnection, sparks solar flares, coronal mass ejections, and other phenomena that can imperil Earth-orbiting spacecraft and even power grids on terra firma.

MMS's assignment is to study this mysterious process that occurs when magnetic fields cross and reconnect, releasing magnetic energy in the form of heat and charged particle kinetic energy. But this is just part of the story.

MMS requires a technologically advanced system of four identically equipped spacecraft, which will fly in a tight, tetrahedral formation in Earth's magnetic environment—the magnetosphere—considered the best laboratory for studying magnetic reconnection. But the technological advances needed for MMS start long before the spacecraft are put together. Such advances are also found inside the brand new, 4,200-square-foot, environmentally friendly facility where engineers and scientists at Goddard will assemble and integrate the four spacecraft.

"Everyone can get very excited about the science MMS will gather. That's the cool part," says Dave Richardson, the Goddard facilities Project Manager who managed the facility's development. "But what people may not appreciate is that a lot of state-of-the-art technology went into enabling this mission."

The new high-tech facility resides in former warehouse space that a team of contractors and Goddard employees transformed into a "smart cleanroom." The air inside the space is relatively free of dust, aerosol particles, and chemical vapors—contaminants that can damage highly sensitive science instruments and hardware. To give perspective, outdoor air in a typical urban area contains one million particles per cubic foot. But the MMS cleanroom will have no more than 10,000 particles per cubic foot. These particles are small, too, measuring less than half a micron in diameter or about half the width of a human hair.



Caption: The MMS clean room during construction.

Although cleanrooms are ubiquitous in manufacturing and research facilities, the MMS facility stands out because it features state-of-the-art technology that not only filters air to remove contaminants but also performs this job with 30 percent less energy under low-load conditions.

"This effort will save NASA tens of thousands of dollars in electric bills each year, Richardson said, "and will pave the way for the Goddard team to revolutionize the way we run our facilities."

Planning began nearly two years ago and presented challenges for the team, said Scott Clough of Libration Systems Management, Inc., a Goddard contractor who led the facility's design. "The biggest requirement was space. The MMS mission needed a single location from which to assemble the four spacecraft. If we hadn't found a suitable location, the mission would have had to use four different locations, requiring technicians to move equipment around. This would have slowed down spacecraft assembly. With one large space we were able to save money and time."



Caption: Spacecraft hardware in the newly completed MMS clean room.

The size of the MMS cleanroom is notable, second only to Goddard's other cleanroom—one of the world's largest—where technicians are assembling the *James Webb Space Telescope*.

For the energy misers, though, the size requirements made their jobs harder. The larger the facility, the more energy it uses. "Cleanrooms aren't very efficient," says Project Manager Bill Bond, of QinetiQ North America, a contractor that operates clean room facilities for Goddard. "Airflow is always moving, and that takes energy."

The team worked hard to build in energy savings into everything they could. One of the largest aids to efficiency comes from a computer-controlled sensing system that switches off lights when no one is using the facility and orders the facility's 153 High Efficiency Particulate Air (HEPA) fans to slow down if the particle monitors sense the cleanroom has reached the required cleanliness levels. Should someone enter the facility, the system turns on the lights. When the particulate count reaches higher levels, it commands the fans to operate at higher speeds, filtering and distributing the air inside the voluminous space.

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Deconstructing a Mystery: What Caused Snowmageddon?

By Christina Coleman

In the quiet after the storms, streets and cars had all but disappeared under enormous piles of snow. The U.S. Postal Service suspended service for the first time in 30 years. Snow plows struggled to push the evidence off major roads. Hundreds of thousands of Washington metropolitan area residents grappled with the loss of electricity and heat for almost a week.

By Feb. 10, 2010, the National Weather Service reported that three storms spanning from December to February in the winter of 2009-10 had dumped a whopping 54.9 inches of snow on the Baltimore-Washington area. The snowfall broke a seasonal record first set in 1899. "Snowmageddon," as the winter was dubbed, entered the history books as the snowiest winter on record for the U.S. East Coast.



Photo credit: NASA/Goddard

Caption: The Parkway gate after "Snowmageddon."

Two years later, scientists are still searching to identify the set of conditions that enabled storms of this magnitude to occur. To determine a direct cause to infrequent but major winter storms, Siegfried Schubert and colleagues Yehui Chang and Max Suarez—all from Goddard—became detectives.

Schubert is a meteorologist and Senior Research Scientist for Goddard's Global Modeling and Assimilation Office (GMAO). Using a computer model that simulates the atmosphere, called the Goddard Earth Observing System Model, Version 5 (GEOS-5), Schubert pieced together the meteorological whodunit of 2010's Snowmageddon.

"There are things that we know that affect storminess over the U.S.," Schubert said. "One is when there is an El Niño, which tends to favor more storms. Given the connection between El Niño and sea surface temperatures, we thought we'd actually do a modeling study to see if we could pinpoint the role of sea surface temperatures in driving the snowstorms."

El Niño is an ocean-atmospheric climate pattern characterized by unusually warm sea surface temperatures and heightened rainfall in the central and eastern tropical Pacific. The increased rain occurs when warm sea surface temperatures heat the surrounding air, which then rises and condenses into rain clouds. The end result of these changes in the tropics is a shifting of the extra-tropical air currents, or jet streams. Changes in the jet streams can then alter storm paths around the globe.

Over the U.S., El Niño tends to produce an unusual eastward extension of the Pacific jet stream and storminess across the southern tier of states. Using the GEOS-5 model, Schubert and his team isolated the role that sea surface temperatures played in changing the storminess across the Northern Hemisphere. By initializing the model with the early December 2009 atmospheric conditions and the higher sea surface temperatures from that time, Schubert and his colleagues were able to reproduce many of the subsequent changes in winter storminess.

"El Niño is predictable on monthly and seasonal time scales. But we know that sea surface temperatures don't control everything about the atmosphere," Schubert said. "Storms develop in the atmosphere whenever they decide to as a result of instabilities. Models can't replicate the actual sequence of events in predictions extending beyond a few weeks, but they can predict whether or not there will be more or fewer storms, because of the sea surface temperatures." Schubert and his team ran 50 different simulations, slightly changing the atmospheric conditions each time while keeping the actual sea surface temperatures the same. The data showed that the storms were influenced more by the sea surface temperatures, and less by the changing atmospheric conditions.

"The atmosphere is chaotic, but if we do this over and over again, slightly changing the initial conditions, we can average the runs, filter out all the random atmosphere variability and see the part that's driven by sea surface temperatures," Schubert said.

While El Niño tends to produce greater storminess, it does not necessarily lead to more snowstorms along the East Coast. Without colder temperatures, these storms bring just rain.

The second culprit: a fluctuation of the atmospheric pressure differences in the Atlantic between the Icelandic low-pressure field and the Azores high-pressure field further south. This North Atlantic Oscillation controls the strength and direction of westerly winds and storm tracks across the North Atlantic. It is known that in a positive phase, the north-south pressure difference is enhanced and the west-to-east winds are strong, effectively creating a wall that keeps cold air in the Arctic. In the negative phase, the north-south pressure difference is reduced, allowing cold Arctic wind to bear down across the North Atlantic.

"It's a structure that tends to favor cold temperatures on the East Coast when it's in the negative phase," said Schubert. While the atmospheric pressure fields oscillate at daily and weekly time scales, the winter of 2009-10 saw the North Atlantic Oscillation in an extended-negative phase. Combine the resulting influx of Arctic air for an unusually long time with the moisture and storminess from El Niño, and the once fuzzy cause of these storms starts to come into focus. The research shows that the extreme weather over the Eastern U.S. was part of a response to El Niño and its associated Pacific Ocean sea surface temperatures.

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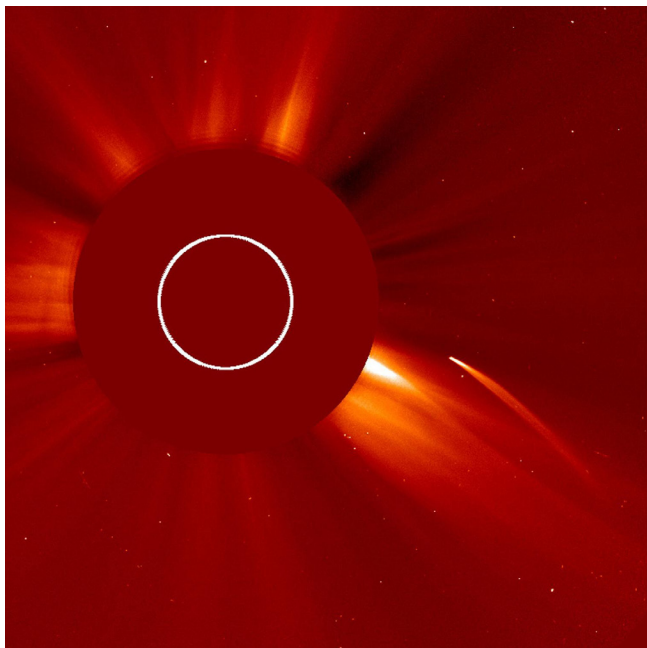
Catching a Comet Death on Camera

By Karen C. Fox

On July 6, 2011, a comet was caught doing something never seen before: dying a scorching death as it flew too close to the Sun. That the comet met its fate this way was no surprise. The chance to watch it first-hand, however, amazed even the most seasoned comet watchers.

"Comets are usually too dim to be seen in the glare of the Sun's light," says Dean Pesnell, Project Scientist for the *Solar Dynamic Observatory* (SDO), which snapped images of the comet. "We've been telling people we'd never see one in SDO data."

But, an ultra bright comet, from a group known as the Kreutz comets, overturned all preconceived notions. The comet can clearly be viewed moving in over the right side of the Sun, disappearing 20 minutes later as it evaporates in the searing heat. As detailed in a paper in *Science* magazine appearing January 20, 2011, watching the comet's death provides a new way to estimate the comet's size and mass. The comet turns out to be somewhere between 150 to 300 feet long and have about as much mass as an aircraft carrier.



Caption: The extremely bright comet that dove into the Sun on July 5 and 6, 2011 was one of the top 15 brightest comets ever spotted by SOHO.

"Of course, it's doing something very different than what aircraft carriers do," says Karel Schrijver, a solar scientist at Lockheed Martin in Palo Alto, Calif., who is the first author on the *Science* paper and is the principal investigator of the Atmospheric Imaging Assembly instrument on SDO, which recorded the movie. "It was moving along at almost 400 miles per second through the intense heat of the Sun—and was literally being evaporated away."

Typically, comet-watchers see the Kreutz-group comets only through images taken by coronagraphs, a specialized telescope that views the Sun's fainter out atmosphere, or corona, by blocking the direct blinding sunlight with a

solid occulting disk. On average, a new member of the Kreutz family is discovered every three days, with some of the larger members being observed for some 48 hours or more before disappearing behind the occulting disk, never to be seen again. Such "Sun-grazer" comets obviously destruct when they get close to the Sun, but the event had never been witnessed.

Karl Battams, a scientist with the Naval Research Laboratory in Washington, DC, who has extensively observed comets with SOHO and is also an author on the paper, was skeptical when he first received the movie. "But as soon as I watched it, there was zero doubt," he says. "I am so used to seeing comets simply disappearing in the SOHO images. It was breathtaking to see one truly evaporating in the corona like that."

After the excitement, the scientists got down to work. Humans have been watching and recording comets for thousands of years, but finding their dimensions has typically required a direct visit from a probe flying nearby. This movie offered the first chance to measure such things from afar. The very fact that the comet evaporated in a certain amount of time over a certain amount of space means one can work backward to determine how big it must have been before hitting the Sun's atmosphere.

The *Science* paper describes the comet and its last moments as follows: It was traveling some 400 miles per second and made it to within 62,000 miles of the Sun's surface before evaporating. Before its final death throes, in the last 20 minutes of its existence when it was visible to SDO, the comet was some 100 million pounds, had broken up into a dozen or so large chunks with sizes between 30 to 150 feet, embedded in a "coma"—the fuzzy cloud surrounding the comet—of approximately 800 miles across, and followed by a glowing tail of about 10,000 miles in length.

It is the coma and tail of the comet being seen in the video, not the comet's core. Close examination shows that the light in the tail pulses, getting dimmer and brighter over time. The team speculates that the pulsing variations are caused by successive breakups of each of the individual chunks that made up the comet material as it fell apart in the Sun's intense heat.

"I think this is one of the most interesting things we can see here," says Lockheed's Schrijver. "The comet's tail gets brighter by as much as four times every minute or two. The comet seems first to put a lot of material into that tail, then less, and then the pattern repeats."

Figuring out the exact details of why this happens is but one of the mysteries remaining about this comet movie. You can watch the movie here: http://www.nasa.gov/mission_pages/sunearth/news/comet-streaks-sun.html.



Image credit: NASA/ESA/SOHO

Goddard Builds State-of-the-Art Sun-Earth Facility

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Another efficient design choice is treating just 10 percent of the air to maintain the proper air conditions, Bond says. The other 90 percent represents already-filtered air that the system has recycled.

Even the cleanroom's massive 20-by-19-foot roll-up access door contributes to the energy savings. The door offers a large opening to accommodate spacecraft parts and components as they are moved inside the facility. Despite its size, the door takes just a couple seconds to roll up, unlike similar doors at other clean rooms that can take up to a minute or more to open. In addition, the door rolls inside a spiral track, preventing the inside surface from touching the outside surface. The room, therefore, is exposed to contaminated, unfiltered air for shorter periods of time, drastically reducing the energy needed to treat large quantities of fresh air. Outside contaminants aren't transferred to the inside just by opening the door, either. Those particulates that do enter are then filtered and redistributed.

While MMS needed a relatively large space, other missions in the future may not. Therein lies another advantage of the new cleanroom, designed and constructed by CleanAir Solutions of Fairfield, Calif.

"It's versatile," says company president Kathie Kalafatis. Unlike fans in traditional cleanrooms that run at full throttle at all times—regardless of the cleanliness of the air—this cleanroom senses particulates in the air stream and can modulate the fan speed up and down depending on the particle readings to make sure the room always stays in specification. This level of control allows technicians to partition off parts of the room to accommodate different missions. "I call it the room-in-a-room concept," she says.

"This really is a creative design. I really appreciate what the design team came up with. They looked at many, many ways we could maximize the cleanroom size, make it versatile, and meet performance and energy-reduction goals," Richardson says. "This is a darn interesting engineering feat."

Before the cleanroom could open for business it had to pass a Latent and Sensible Heat Load Test. Members of the MMS project were called upon to gown up in special cleanroom suits and walk around in the cleanroom to generate heat and move particles around. Some participated in an impromptu exercise session, while others power walked around the room.

"The test results verified that the heating, ventilating and air conditioning (HVAC) system is capable of keeping the cleanroom within specific temperature and humidity requirements," said integration and test manager Joanne Baker of Goddard.

With all required tests completed, the new cleanroom is ready for MMS spaceflight hardware.

For more information about the MMS mission, visit: <http://mms.gsfc.nasa.gov>. ■

Snowmageddon

Continued from Page 7

The results were then compared with those of a winter (1999-2000) characterized by having completely opposite conditions: a La Niña and a positive phase of the North Atlantic Oscillation. When compared with Snowmageddon, the winter of 1999-2000 showed less storminess and decreased chances of snow. This comparison helped Schubert and his team corroborate the hypothesis, confirming that El Niño-induced sea surface temperatures and an extended negative phase of the North Atlantic Oscillation caused the changes in 2009-10 winter storminess.

In order to improve snow predictions, scientists need to better understand how the North Atlantic Oscillation works and what causes it to stay in an extended period.

There is evidence that the extended negative mode is impacted by sea surface temperatures and maybe even snow cover in Asia. Scientists, however, have not directly linked any one weather variable to the North Atlantic Oscillation.

"People have done these historical studies before to come up with measures, and if you look at the record of major snow storms, some have occurred during El Niño winters and a negative North Atlantic Oscillation phase," Schubert said. "But sea surface temperatures impacting storminess in the different ocean basins has never been quantified and it's never been clear what is a relative contribution and in what way they are contributing," he added.

Richard Seager, a research professor at the Lamont-Doherty Earth Observatory at Columbia University, also studies how El Niño and weakened atmospheric pressure contributes to snow anomalies.

"This model not only confirms that a negative North Atlantic Oscillation and El Niño conditions created the conditions that allowed these storms to form," said Seager, who did not work with Schubert on this research. "But it is useful in showing how the atmosphere can act differently when combining El Niño with different sea surface temperatures. These models provide controlled conditions, which allow us to be sure about the exact causes," Seager added.

Scientists have predicted that current La Niña conditions and below-average sea surface temperatures might be the cause for the mild 2012 winter on the Eastern U.S. Examples like this, Schubert said, is why it is important to better understand the relationship between sea surface temperatures and storminess. "People want to know whether it's going to be a snowy winter. Snow prediction is developing but if we predict El Niño, we know it will be more likely stormier. Now whether those storms will be rain or snow depends on the North Atlantic oscillation, which is a big challenge for us because of its constant oscillations." Schubert and his team's extended findings on the role of sea surface temperatures in Snowmageddon will be published in the *Journal of Climate* this spring. ■

NASA Scientists Awarded Distinctions as 2012 AGU Elected Fellows

By Elizabeth Zubritsky

NASA scientists figure prominently in the distinguished group honored as Fellows of the American Geophysical Union (AGU) in 2012. Dr. F. Michael Flasar, a planetary scientist at Goddard, and Dr. Anthony D. Del Genio, a physical scientist at NASA's Goddard Institute for Space Studies (GISS), New York, have been named AGU Fellows. Dr. James Slavin, who recently moved from NASA Goddard to the University of Michigan, was also named a Fellow.

These scientists are among the 61 new AGU Fellows elected in recognition of their acknowledged eminence in Earth and space sciences. No more than 0.1% of the total membership of AGU can receive this honor in any given year. New Fellows are nominated by their scientific peers and chosen by a committee of existing Fellows. The new Fellows will be presented with an official certificate during a ceremony to be held at the AGU meeting in San Francisco in the fall of 2012.

"To be elected a Fellow of AGU is a special tribute, and it is great to see these outstanding Goddard scientists being recognized by their peers," says Dr. Nicholas White, Director of Goddard's Sciences and Exploration Directorate.

Flasar was cited for his "fundamental contributions to planetary and atmospheric science," particularly his research on the atmospheres of Jupiter and Saturn, as well as Saturn's moon Titan, the only satellite in the solar system to have a planet-like atmosphere. He is the Principal Investigator for the infrared instrument, called the Composite Infrared Spectrometer (CIRS), aboard NASA's *Cassini* spacecraft. CIRS measures temperature and can provide a wealth of information about the surface, internal structure, and atmosphere of a planet or moon. Flasar is also a member of the Cassini Radio Science team, which investigates Saturn's and Titan's atmospheres, measures the gravity of Saturn and its moons and studies the properties of Saturn's rings.

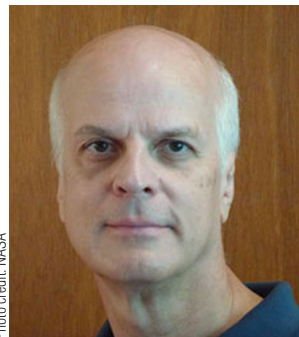


Photo credit: NASA

Caption: Michael Flasar.

Studies by Flasar and his colleagues have highlighted the similarities between the meteorology and global climates of Earth and these other bodies, as well as the rich diversity of planetary atmospheres. Flasar predicted, for example, that Titan has a jet-stream-like wind pattern near the winter pole that isolates a pocket of air in much the same way that air currents on Earth set up the atmospheric conditions for the ozone holes to form. Detailed measurements made by CIRS later confirmed the existence of this wind pattern in the northern hemisphere. Flasar also was on the team that discovered one of Titan's most puzzling features: most of the atmosphere rotates up to 20 times faster than the moon itself.

A senior researcher at GISS, Del Genio was cited for "fundamental contributions in atmospheric and cloud physics, including the use remote sensing

data, to improve basic understanding of climate physics and reliable climate forecasting capability."

Del Genio is perhaps best known in the science community for his fundamental physics-based parameterizations of clouds and rainstorms that he developed for the GISS global climate model and his insights into how cloud processes will change in a warming climate. He is among the few climate modelers who is also active in data analysis research and has used data from the NASA *CloudSat* and *Tropical Rainfall Measuring Mission*, as well as the U.S. Department of Energy's Atmospheric System Research Program, to understand the sensitivity of storm clouds to environmental conditions. With his collaborators, he separated El Niño and Pacific Decadal Oscillation variability from 20th-century trends in sea surface temperature and meteorological fields and used satellite data to detect a strengthening of the tropical general circulation in the late 20th century.

Del Genio has had a long involvement in planetary science as well. His Pioneer Venus mission research with fellow GISS scientist Bill Rossow included the first application of automated cloud tracking techniques to satellite data. This work produced papers documenting for the first time Venus's then-unfamiliar global super-rotation as well as the planetary-scale waves that modulate its inter-annual variability. Del Genio is also a member of the *Cassini* mission imaging team and has documented winds and the processes responsible for maintaining the general circulation of the atmospheres of Saturn and Titan.

Slavin was recognized for "fundamental contributions to the understanding of the solar wind interactions with the planets and the structure and dynamics of the Earth's magnetosphere." He has served or is presently serving as a Science Investigator on 19 space science missions including the *Cluster*, *Space Technology 5*, *MESSENGER*, *Magnetospheric MultiScale*, and *BepiColombo* missions. During his 30 years with NASA, he served as director of the Helio-physics Division at Goddard, has held leadership positions in the Electrodynamics Branch and in Magnetospheric Physics at NASA Headquarters in Washington, and was a planetary scientist at NASA's Jet Propulsion Laboratory, Pasadena, Calif. Slavin is now a professor at the University of Michigan and chair of the Atmospheric, Oceanic, and Space Sciences Department.

For more information about the AGU Fellow award, visit: <http://www.agu.org>.

For more information on *Cassini*'s CIRS and Flasar's work, visit: <http://cirs.gsfc.nasa.gov>.

For more information on Del Genio's work, visit: <http://www.giss.nasa.gov/staff/adegenio.html>.

For more information on Slavin's work, visit: <http://aoss.engin.umich.edu/people/jaslavin>. ■

Don't Sweat the Small Stuff. Or Should We?

By Michelle R. Jones

Have you ever been in a situation where you had a feeling that a supervisor or colleague didn't care for you and you just could not figure out why you felt that way? After all, they said all the "right things" to you. The real question is: how did what they say or didn't say make you feel?

You have no concrete evidence of their indifference towards you, but you knew for sure that each of your interactions with this person left you with a small, emotional scar. Over time, that little scar turned into a major bruise that impacted your productivity, effectiveness, and overall well-being.

This scenario, and others like it, was discussed at the February 2 Exploring Leadership Colloquium, where Stephen Young, author of "Micromessaging: Why Great Leadership is Beyond Words," presented "MicroInequities: The Power of Small."

"Micromessages," "MicroInequities," and "MicroAffirmations" are not terms that most are familiar with. After an engaging presentation by Young, however, attendees walked away with the understanding that Micromessages, which are subtle, semi-conscious, universally understood messages that tell others what we really think, are categorized as either MicroInequities or MicroAdvantages. MicroInequities are cumulative micromessages that devalue, discourage, and impede performance continually directed, consciously or not, to a particular individual or group. MicroAdvantages are cumulative micromessages that encourage and enhance performance.

Understanding these definitions allows for a personal connection to be made to not only what others have done to us, but also to what we may have been doing to others. Research shows that an estimated 2–4,000 micromessages are sent and received throughout the course of a single day. One source provided the list below as a sample of the many messages sent and received on daily basis:

- o Weak handshake with little or no eye contact
- o Losing eye contact while someone speaks
- o Praising an idea presented by one; ignoring the same idea presented by another
- o Pecking away at a Blackberry/other device while someone is talking
- o Looking at a clock or watch while someone is talking
- o Hovering over someone in a controlling or menacing way
- o Replying to someone with sarcasm

Alvin Poussaint, psychologist and author, compares these small acts to "death by a thousand cuts." As this quote points out, the lasting, negative impact comes from the repetitiveness of the action, not just the action itself.



Caption: Stephen Young presenting "MicroInequities: the Power of Small."

Young emphasized the importance of not only focusing on the words that one uses, but also taking into consideration what the receiver heard, felt, or saw. In addition, Young also made a case for why an organization's impact in the diversity and inclusion arena could never be measured only by looking at whether the "right things" are being done. Instead, he challenged the audience to forgo the urge to simply check a box and focus our attention on the impact and effectiveness our words and actions have on others. He left us all with a timely reminder of the *Platinum Rule*: "Treat others the way they want to be treated."

Stephen Young is partner and founder of Insight Education Systems, a company specializing in leadership effectiveness and organizational development services. For more than a decade, Young has been a featured speaker at business conferences worldwide. His work has been published in numerous business articles and recognized in a myriad of industry trade and business publications including *The Wall Street Journal*, *Time*, and *Diversity Inc.* Insight Education Systems' leadership seminar "MicroInequities: The Power of Small™" has been delivered to over 10% of the *Fortune 500* in 24 countries.

To see Young's presentation in its entirety, visit:

<http://exploringleadershipcolloq.gsfc.nasa.gov/webcasts.html>. ■

OutsideGoddard: Marcellus Proctor Witnessing Maryland and Native American History

By Elizabeth M. Jarrell

Associate Branch Head Marcellus Proctor of the Parts, Packaging, and Assembly Technologies Branch in the Applied Engineering Technology Directorate, is a proud member of the Piscataway Conoy Tribe. He was the Chairperson and remains a member of Goddard's Native American Advisory Committee. Proctor was present on January 9, 2012, when Maryland Governor Martin O'Malley signed two Executive Orders officially recognizing three Native American tribes indigenous to Maryland; namely, the Piscataway Indian Nation and the Piscataway Conoy Tribe which includes both the Piscataway Conoy Confederacy Subtribes and the Cedarville Band of Piscataway Indians.

Proctor explains, "This is the first time in Maryland's history that the state recognized its indigenous people. The Piscataway Conoy Tribe has about 1,800 enrolled members and the Piscataway Indian Nation has over 100 enrolled members. 'Enrolled' means that a person has successfully documented and identified his lineage as a member of a particular tribe as determined by the Tribal Council." He continues, "All three Tribes, our people, lived near the Chesapeake Bay and various tidal tributaries of the Potomac River. We were fisherman but also grew corn and tobacco. To this day we still have a corn dance festival." He adds that all three tribes share the same ancestral language, Algonquian, which they are trying to rediscover.

Proctor further explains, "Recognition means that the state now officially declares that there are Native Americans in Maryland whose ancestors were here prior to colonization. It is an acknowledgment of our existence and historical importance to the state. We as a people always knew our identity; however, it was important for the state to also do so. Recognition is the result of decades of work and compromise between the Piscataway Tribes and the State of Maryland."

Proctor will never forget the recognition ceremony held in Annapolis the day of the signing. "About 200 of the Piscataway People consisting of all three tribes stood in the rotunda of the State Capital building. We stood together proud of what we had achieved together. A few were in Native dress. A chosen few played the ceremonial drums. The Chiefs of the three tribes sat together with Governor O'Malley and Maryland Secretary of State John McDonough." Each tribal chief gave a speech as did the Governor and other officials.

The ceremony ended with a symbolic exchange of gifts. The Governor presented each Chief with a signed copy of the Executive Orders. Each Chief then, in turn, gave the Governor a gift. The gifts were a beaded medallion, a tribal flag, and tobacco.

He views state recognition as a stepping stone to obtaining Federal recognition. According to Proctor, state recognition makes these tribes eligible for about \$17 million in potential funding sources, but Federal recognition would give them access to additional potential funding.

"To me," says Proctor, "Maryland state recognition means that I can go in front of other Native People as a representative of this state-recognized tribe. Maryland was one of the last states to recognize their Native population." He notes something else special about that day. "Despite the differences among the three tribes, on that day we all stood as one to achieve the goal of recognition by the State of Maryland."



Photo provided by Marcellus Proctor

Caption: Proctor at a lifetime members ceremony at the American Indian Science & Engineering Society (AISES) Annual Conference.

State recognition has another personal impact on Proctor. Goddard often sends him to conduct speaking engagements and other outreach events. Says Proctor, "Whenever I represent Goddard, I make it a point to tell the audience that I am a proud member of the Piscataway Conoy Tribe. I try to tell others about our culture."

Proctor's cultural overview begins by explaining that while these tribes do not have a reservation, some families within each tribe own ancestral lands scattered throughout Southern Maryland that they use for festivals and ceremonies. For example, the tribes have burial grounds and ceremonial gathering places used for pow wows and seasonal festivals relating to the harvest. Each tribe has unique ceremonial dress for men and women, a special flag, and a sacred animal. Each tribe has a Tribal Council headed by the Tribal Chair and advised by the Elders. For tribal matters, the Tribal Council is empowered by the members to represent their best interests both within the tribe and outside the tribe in, for example, obtaining state recognition. Proctor will most likely now begin his cultural overview by proudly explaining about Maryland's recognition of these three tribes.

To learn more about the tribes mentioned in this article, visit the following Web sites: Piscataway Conoy Tribe—<http://www.piscatawayconoy.org>, Cederville Band of Piscataway Indians—<http://www.piscatawayindians.org>, Piscataway Nation—<http://www.piscatawaynation.org>.

To watch the video of the ceremony on the Governor's blog, visit: <http://www.governor.maryland.gov/blog/?p=3393>.

To see photos taken during the ceremony by the Maryland Governor's Office, visit: <http://www.flickr.com/photos/mdgovpics/sets/72157628823625525>. ■